

Gunnison Copper Project
Aquifer Protection Permit No. P-511633
Place ID 147653, LTF No. 77535
Other Amendment

I. Introduction:

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an Aquifer Protection Permit (APP) for the subject facility that covers the life of the facility, including operational, closure, and post-closure periods unless suspended or revoked pursuant to Arizona Administrative Code (A.A.C.) R18-9-A213. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards (AWQS) at the Point of Compliance (POC); and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). BADCT's purpose is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., the local subsurface geology), to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer or to prevent pollutants from reaching the aquifer.

II. Permittee & Facility Location:

Excelsior Mining Arizona, Inc. (EMA)
2600 North Johnson Road
Dragoon, Arizona 85609

III. Facility Description:

The project is an in-situ leaching and recovery operation (ISR) located in Cochise County. The copper recovery process involves injecting leach solutions (lixiviant) into the orebody using injection wells and extracting copper-bearing solutions (pregnant leach solutions or PLS) through surrounding recovery wells. The estimated injection zone is between approximately 250 feet below ground surface (ft bgs) to 1,500 ft bgs. The resulting copper-bearing solution will be pumped by recovery wells to the surface where copper will be removed from the solution in a solvent extraction electrowinning (SX/EW) plant. The barren solution from the SX/EW plant will be re-acidified and re-injected back into the oxide zone.

The project will be constructed and operated in three stages.

Stage 1 Mining

Stage 1 will be developed in the southern part of the wellfield on approximately 21 acres. The duration of this stage is 10 years and is expected to generate approximately 25 million pounds of copper per year. During this stage, approximately 200 injection/recovery wells are planned to be installed and operated. Recovered solutions (PLS) will be conveyed between the Gunnison wellfield and process solution ponds located at the Johnson Camp Mine (JCM) facility (permitted under the APP Permit No. P-100514) through several pipelines approximately 3 miles in length. Raffinate will be re-acidified at the JCM facility and pumped back as lixiviant to the project site. A PLS Pond, Pipeline Drain Pond and an Evaporation Pond #1 will be constructed during this stage.

Stage 2 Mining

Stage 2 will be developed on approximately 42 acres. The duration of this stage is 3 years and is expected to generate approximately 75 million pounds of copper per year. During this stage, approximately 230 injection/recovery wells are planned to be installed and operated. Several ponds, including a Raffinate Pond, Recycled Water Pond, Solids Ponds 1 and 2, Plant Runoff Pond, and the SX/EW plant will be constructed at the project site during this stage.

Stage 3 Mining

Stage 3 will be developed on approximately 161 acres. The duration of this stage is 7 years and is expected to generate approximately 125 million pounds of copper per year. During this stage, approximately 1004 injection/recovery wells are planned to be installed and operated.

IV. Amendment Description:

The purpose of this amendment is to make the APP consistent with the Underground Injection Control (UIC) Permit issued by the EPA. Specifically, there are two aspects of the APP that Excelsior seeks to amend the permit for the following:

- Maximum injection pressure – The maximum injection pressure in the current APP is set at 0.75 psi/ft. EMA requested that the injection pressures in the APP be established to match the UIC Permit which are based on the lowest fracture gradient for each formation. Table 4.1-8 in the APP lists each formation and its respective maximum injection pressure.
- Use of inactive hydraulic control (HC) wells as monitor wells – Specifically, the UIC specifies that specific conductance and other level 1 indicator parameters at the inactive Hydraulic Control Wells be sampled monthly during the first year of ISR operations. These monitoring requirements were not specified in the current APP.
- Replacement intermediate monitoring wells (IMWs) – The IMWs NSM-001, NSD-024 and NSH-024 could not be rehabilitated and were subsequently replaced with monitoring wells CS-07, NSM-004 and MCC-03. The replaced and new wells are configured within the inner ring. Well construction details indicate the original and replacement IMW wells have similar completion intervals and therefore they should be adequate for monitoring purposes given the close proximity to the Original IMWs.

V. Regulatory Status

Currently, the facility is in compliance with the APP.

VI. Best Available Demonstrated Control Technology (BADCT):

The Pipeline Drain Pond and the Plant Runoff Pond will be single-lined with a minimum 60-mil HDPE liner, the PLS Pond will be double-lined with 80-mil HDPE primary liner underlain by 200 mil geonet and 60-mil HDPE, the remaining ponds will be double-lined with a minimum 60-mil HDPE liner separated by a minimum 200 mil geonet.

Injection and recovery rates from the wellfield are approximately equal with net extraction obtained from the surrounding hydraulic control wells. Details on the BADCT for the ponds,

wellfield, and the hydraulic control wells are located in Sections 2.2.3, 2.2.4, 2.3, 2.5 and Tables 4.1-2, 4.1-3 and 4.1-9.

VII. Compliance with Aquifer Water Quality Standards (AWQS):

Prior to initiation of mining:

- During Stage 1, three POC wells will be installed, and one POC well is identified as a conceptual POC well location.
- During Stages 2 & 3, two POC wells will be installed, and four POC wells are identified as a conceptual POC well locations.

Hydrology

The local geology has the following site-specific characteristics:

- The alluvium above the ore body is primarily unsaturated or if the alluvium is saturated, it is limited in extent and thickness
- The fault network and bedding plane fractures result in hydraulic connections over long distances
- Natural groundwater gradients are steep on the west side of the wellfield and less steep across the wellfield with overall gradients from west to east
- Large attenuation capacity of limestone within and downgradient of the zone of injection.

The groundwater flow direction is to the east. The pollutant management area (PMA) encompasses Stages 1, 2, and 3 wellfield and all ponds. The discharge impact area (DIA) is the same as the PMA.